Typical Program Specification Tree

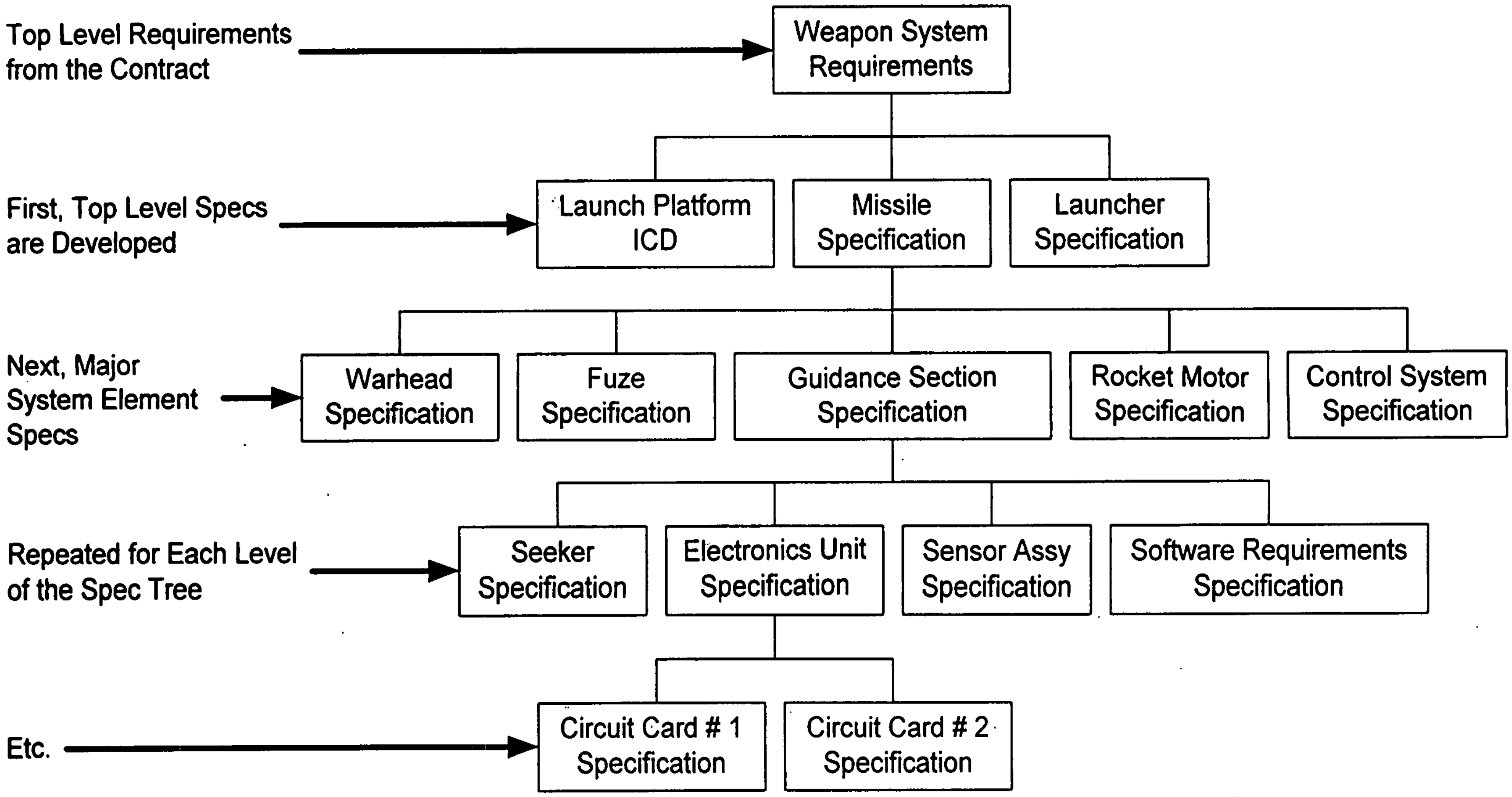

Top Level Requirements from the Contract
Weapon System Requirements
First, Top Level Specs are Developed
Launch Platform ICD
Missile Specification
Launcher Specification
Next, Major System Element Specs
Warhead Specification
Fuze Specification
Guidance Section Specification
Rocket Motor Specification
Control System Specification
Repeated for Each Level of the Spec Tree
Seeker Specification
Electronics Unit Specification
Sensor Assy Specification
Software Requirements Specification
Etc.
Circuit Card # 1 Specification
Circuit Card # 2 Specification

FIG.1

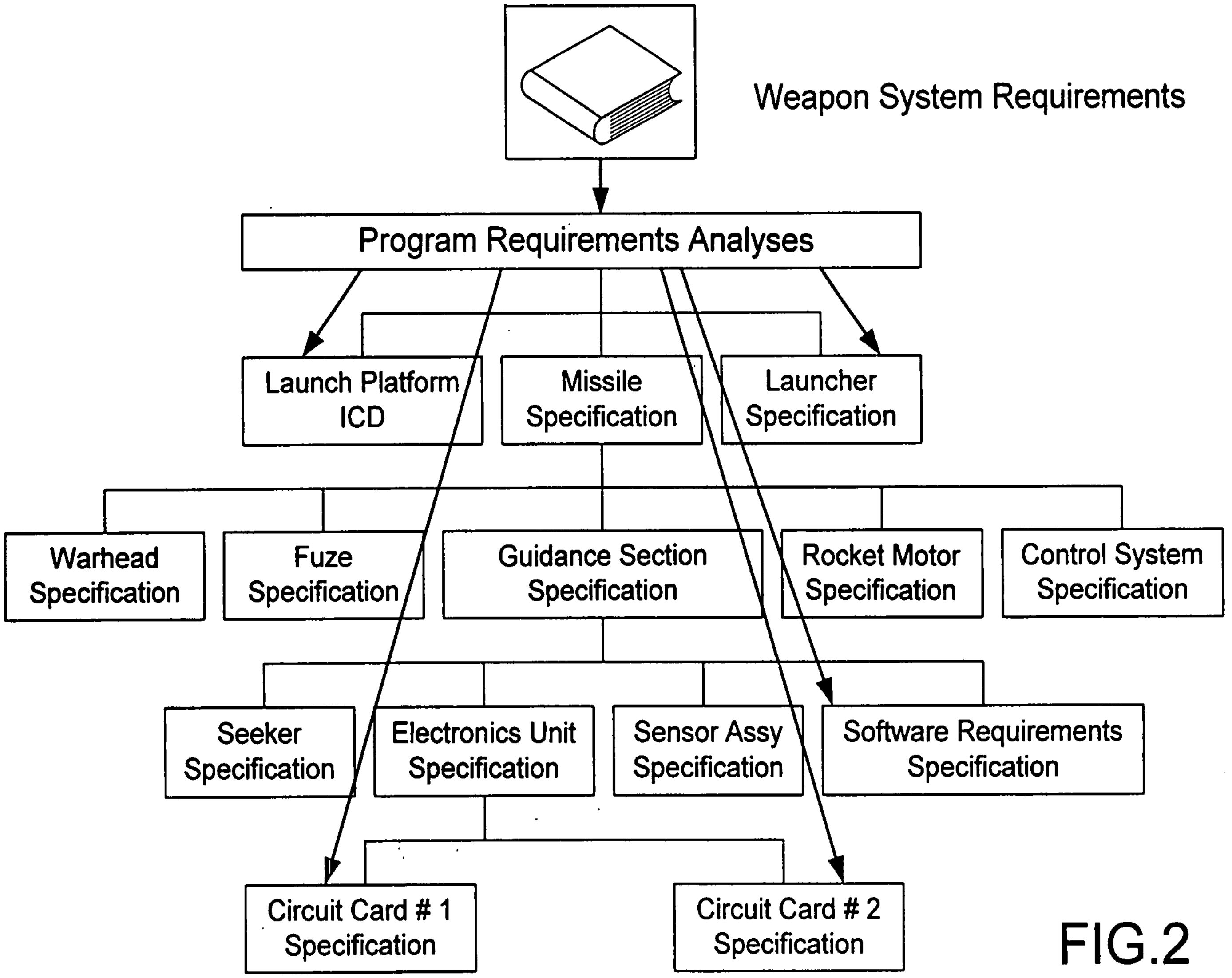
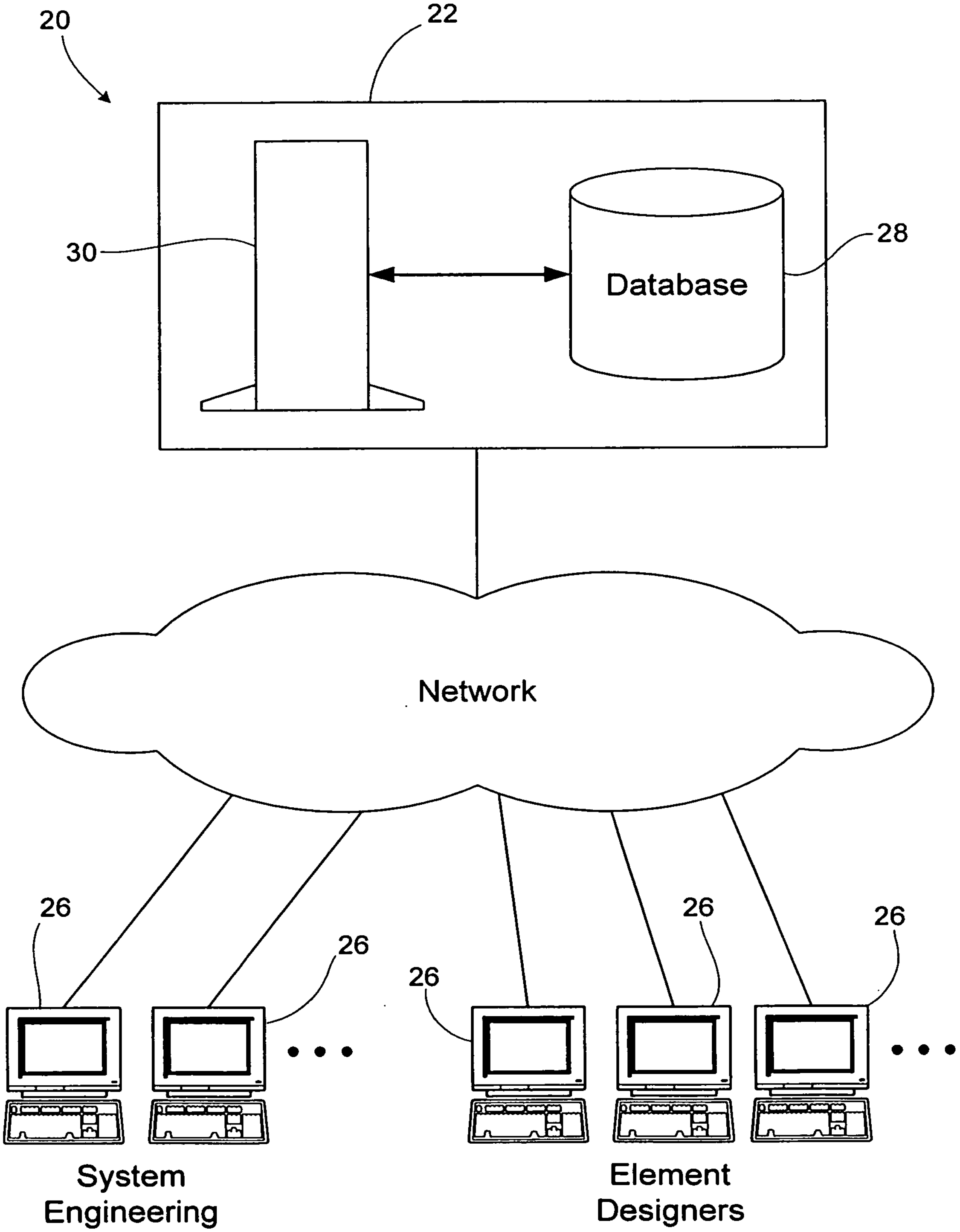

Weapon System Requirements
Program Requirements Analyses
Launch Platform ICD
Missile Specification
Launcher Specification
Warhead Specification
Fuze Specification
Guidance Section Specification
Rocket Motor Specification
Control System Specification
Seeker Specification
Electronics Unit Specification
Sensor Assy Specification
Software Requirements Specification
Circuit Card # 1 Specification
Circuit Card # 2 Specification

FIG.2



Database
Network
System Engineering
Element Designers

FIG. 3

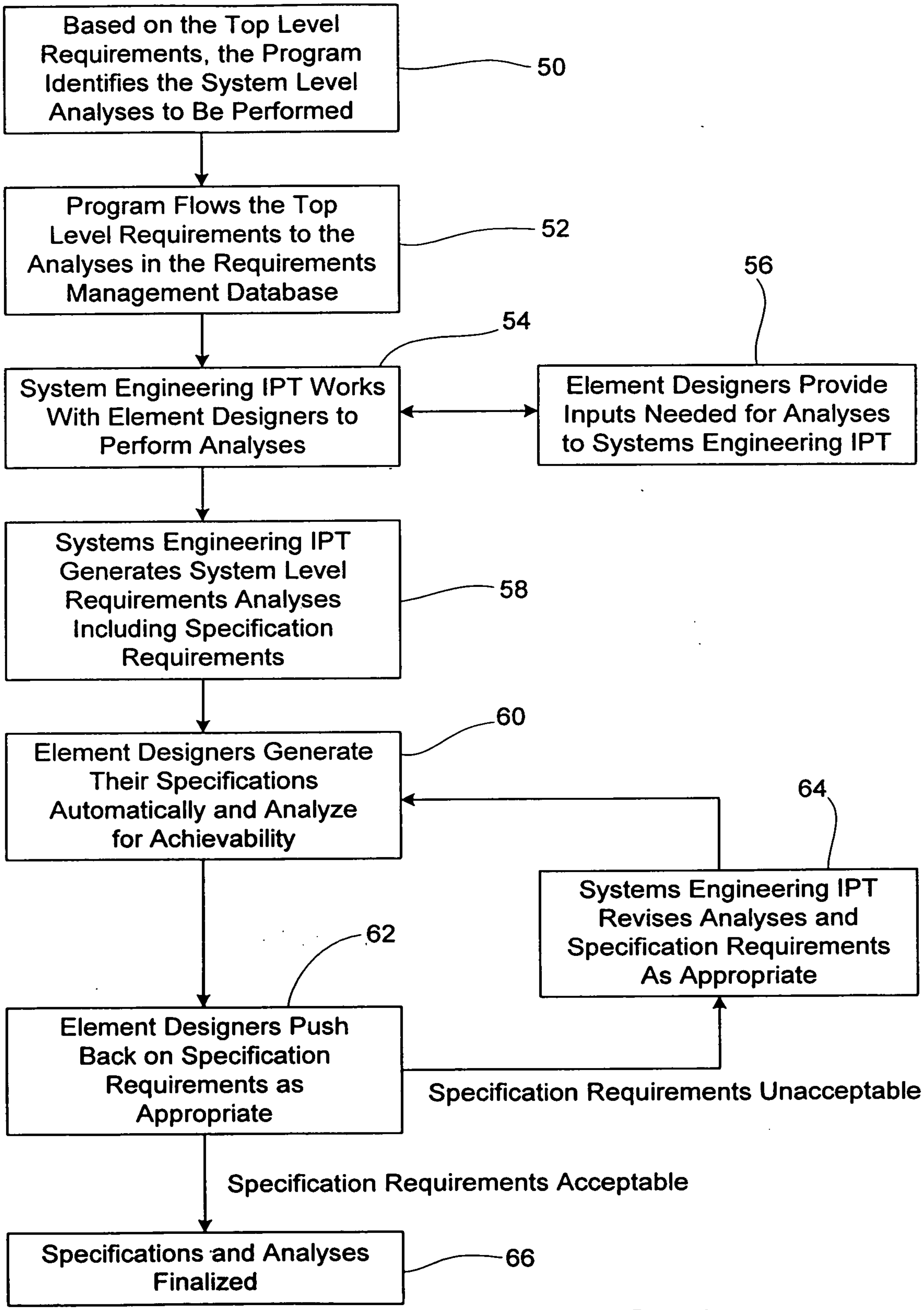

Based on the Top Level Requirements, the Program Identifies the System Level Analyses to Be Performed
50
Program Flows the Top Level Requirements to the Analyses in the Requirements Management Database
52
56
54
System Engineering IPT Works With Element Designers to Perform Analyses
Element Designers Provide Inputs Needed for Analyses to Systems Engineering IPT
Systems Engineering IPT Generates System Level Requirements Analyses Including Specification Requirements
58
60
Element Designers Generate Their Specifications Automatically and Analyze for Achievability
64
Systems Engineering IPT Revises Analyses and Specification Requirements As Appropriate
62
Element Designers Push Back on Specification Requirements as Appropriate
Specification Requirements Unacceptable
Specification Requirements Acceptable
Specifications and Analyses Finalized
66

FIG. 4

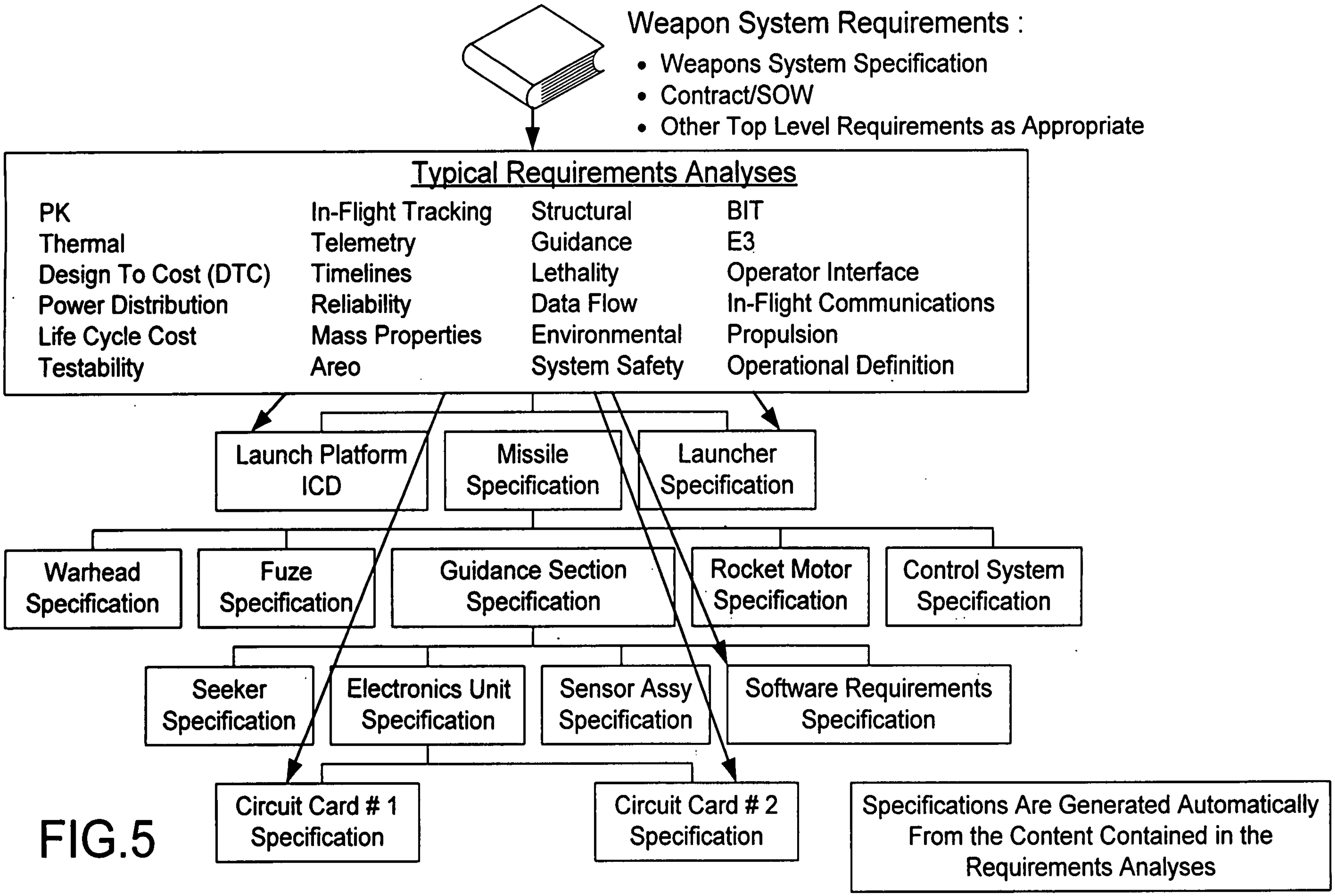
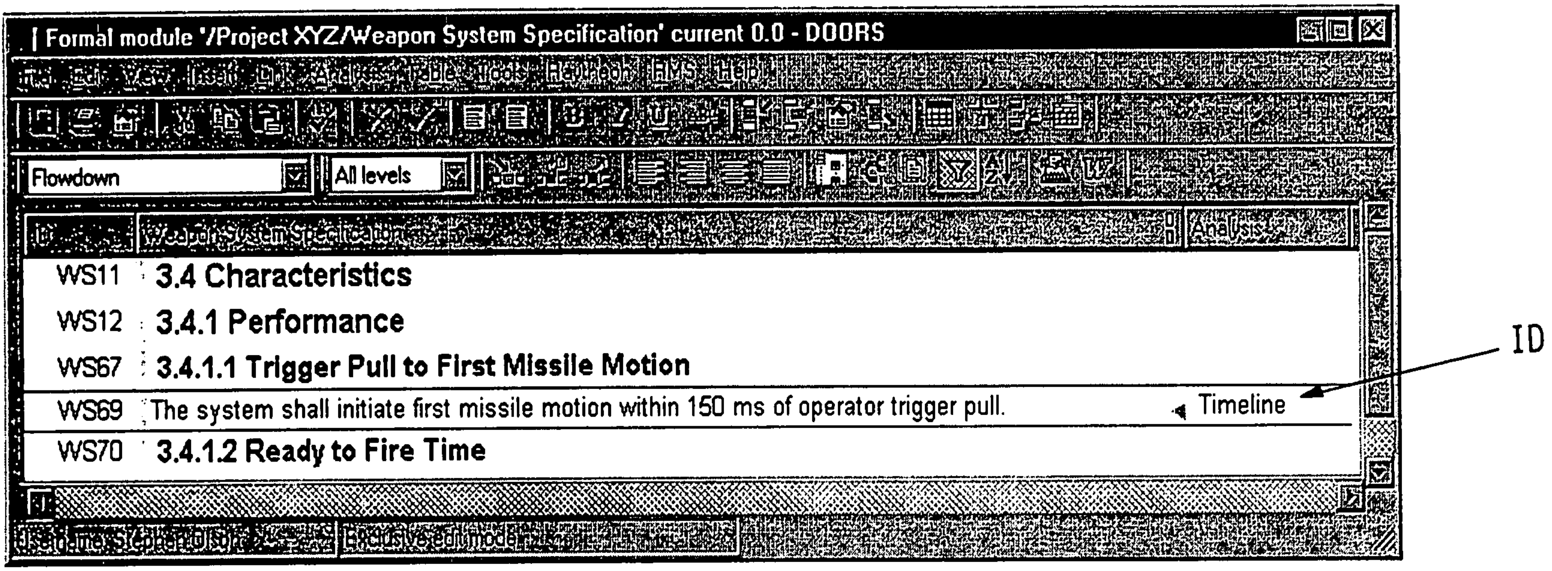

Weapon System Requirements :
• Weapons System Specification
• Contract/SOW
• Other Top Level Requirements as Appropriate
Typical Requirements Analyses
PK
Thermal
Design To Cost (DTC)
Power Distribution
Life Cycle Cost
Testability
In-Flight Tracking
Telemetry
Timelines
Reliability
Mass Properties
Areo
Structural
Guidance
Lethality
Data Flow
Environmental
System Safety
BIT
E3
Operator Interface
In-Flight Communications
Propulsion
Operational Definition
Launch Platform ICD
Missile Specification
Launcher Specification
Warhead Specification
Fuze Specification
Guidance Section Specification
Rocket Motor Specification
Control System Specification
Seeker Specification
Electronics Unit Specification
Sensor Assy Specification
Software Requirements Specification
Circuit Card # 1 Specification
Circuit Card # 2 Specification
Specifications Are Generated Automatically From the Content Contained in the Requirements Analyses

FIG.5



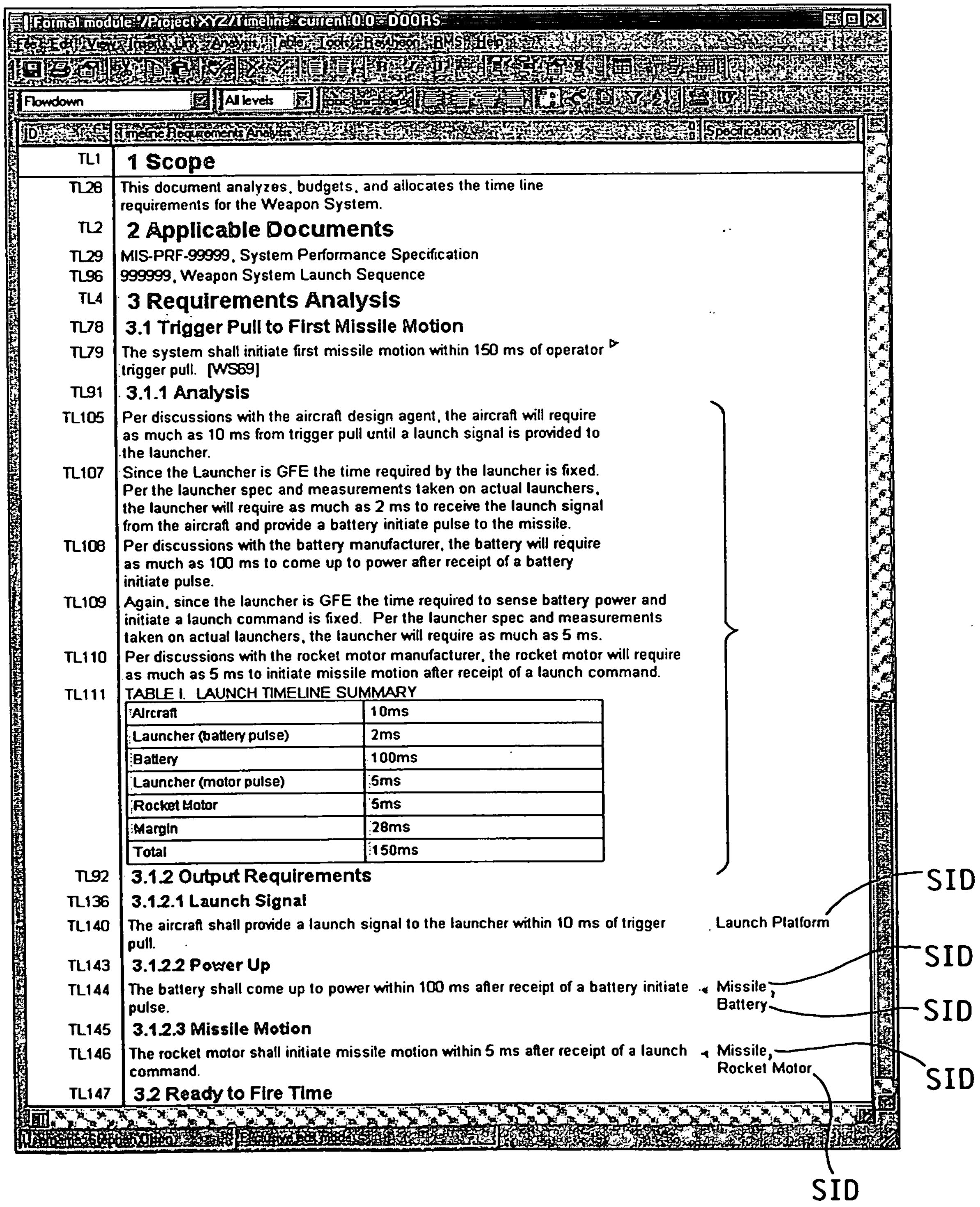
Formal module '/Project XYZ/Weapon System Specification' current 0.0 - DOORS

ID	Weapon System Specification	Analysis
WS11	**3.4 Characteristics**	
WS12	**3.4.1 Performance**	
WS67	**3.4.1.1 Trigger Pull to First Missile Motion**	
WS69	The system shall initiate first missile motion within 150 ms of operator trigger pull.	Timeline
WS70	**3.4.1.2 Ready to Fire Time**	

Username: Stephen Olson

Exclusive edit mode

FIG. 6


Formal module '/Project XYZ/Timeline' current 0.0 - DOORS
File Edit View Insert Link Analysis Table Tools Raytheon RMS Help
Flowdown
All levels
ID
Timeline Requirements Analysis
Specification
SID
SID
SID
SID
SID

TL1 **1 Scope**

TL28 This document analyzes, budgets, and allocates the time line requirements for the Weapon System.

TL2 **2 Applicable Documents**

TL29 MIS-PRF-99999, System Performance Specification

TL96 999999, Weapon System Launch Sequence

TL4 **3 Requirements Analysis**

TL78 **3.1 Trigger Pull to First Missile Motion**

TL79 The system shall initiate first missile motion within 150 ms of operator trigger pull. [WS69]

TL91 **3.1.1 Analysis**

TL105 Per discussions with the aircraft design agent, the aircraft will require as much as 10 ms from trigger pull until a launch signal is provided to the launcher.

TL107 Since the Launcher is GFE the time required by the launcher is fixed. Per the launcher spec and measurements taken on actual launchers, the launcher will require as much as 2 ms to receive the launch signal from the aircraft and provide a battery initiate pulse to the missile.

TL108 Per discussions with the battery manufacturer, the battery will require as much as 100 ms to come up to power after receipt of a battery initiate pulse.

TL109 Again, since the launcher is GFE the time required to sense battery power and initiate a launch command is fixed. Per the launcher spec and measurements taken on actual launchers, the launcher will require as much as 5 ms.

TL110 Per discussions with the rocket motor manufacturer, the rocket motor will require as much as 5 ms to initiate missile motion after receipt of a launch command.

TL111 TABLE I. LAUNCH TIMELINE SUMMARY

Aircraft	10ms
Launcher (battery pulse)	2ms
Battery	100ms
Launcher (motor pulse)	5ms
Rocket Motor	5ms
Margin	28ms
Total	150ms

TL92 **3.1.2 Output Requirements**

TL136 **3.1.2.1 Launch Signal**

TL140 The aircraft shall provide a launch signal to the launcher within 10 ms of trigger pull. — Launch Platform

TL143 **3.1.2.2 Power Up**

TL144 The battery shall come up to power within 100 ms after receipt of a battery initiate pulse. — Missile, Battery

TL145 **3.1.2.3 Missile Motion**

TL146 The rocket motor shall initiate missile motion within 5 ms after receipt of a launch command. — Missile, Rocket Motor

TL147 **3.2 Ready to Fire Time**

FIG. 7

28

		System Level Requirement Anaytsis	System Element Spec.
WS11	Cat: Characteristics		
WS12	Cat: Performance		
WS67	Cat: Trigger Pull to First Missile Motion		
WS69	The system shall initiate first missile motion within 150 ms of operator trigger pull	Timeline	
WS70	Cat: Ready to Fire Time		
... ...	... ...		
WSnn	Top Level Requirement nnn		
TL4	Cat: Requirements Analysis		
TL78	Cat: Trigger Pull to First Missile Motion		
TL79	The system shall initiate first missile motion within 150 ms of operator trigger pull [WS69]	Timeline	
TL91	Cat: Analysis		
TL105	Per discussions with the aircraft design agent, the aircraft will require as much as 10 ms from trigger pull until a launch signal is provided to the launcher.		
TL107	Since the Launcher is CFE the time required by the lancher is fixed. Per the launcher spec and measurements taken on actual launchers, the launcher will require as much as 2 ms to receive the launch signal from the aircraft and provide a battery initiate pulse to the missile		
TL108	Per discussion with the battery manufacturer, the battery will require as much as 100 ms to come up to power after receipt of a battery initiate pulse		
TL109	Again, since the launcher is GFE the time required to sense battery power and initiate a launch command is fixed. Per the launcher spec and measurements taken on actual launchers, the launcher will require as much as 5 ms.		
TL110	Per discussions with the rocket motor manufacturer, the rocket motor will require as much as 5 ms to initiate missile motion after receipt of a launch command.		

ID

ID

FIG. 8A

28 (cont.)

TL111	Table 1: Launch Timeline Summary Aircraft 10 ms Launcher (battery pulse) 2 ms Battery 100 ms Launcher (motor pulse) 5 ms Rocket Motor 5 ms Margin 28 ms Total 150 ms		
... ...	... ...		
TL92	Cat: Output Requirements		
TL136	Cat: Launch Signal		
TL140	The aircraft shall provide a launch signal to the launcher within 10 ms of trigger pull.		Launch Platform
TL143	Cat: Power Up		
TL144	The battery shall come up to power within 100 ms after receipt of a battery initiate pulse.		Missile, Battery
TL145	Cat: Missile Motion		
TL146	The rocket motor shall initiate missile motion within 5 ms after receipt of a launch command.		Missile, Rocket Motor
TL147	Cat: Ready to Fire Time		
... ...	... ...		

SID

SID

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SID

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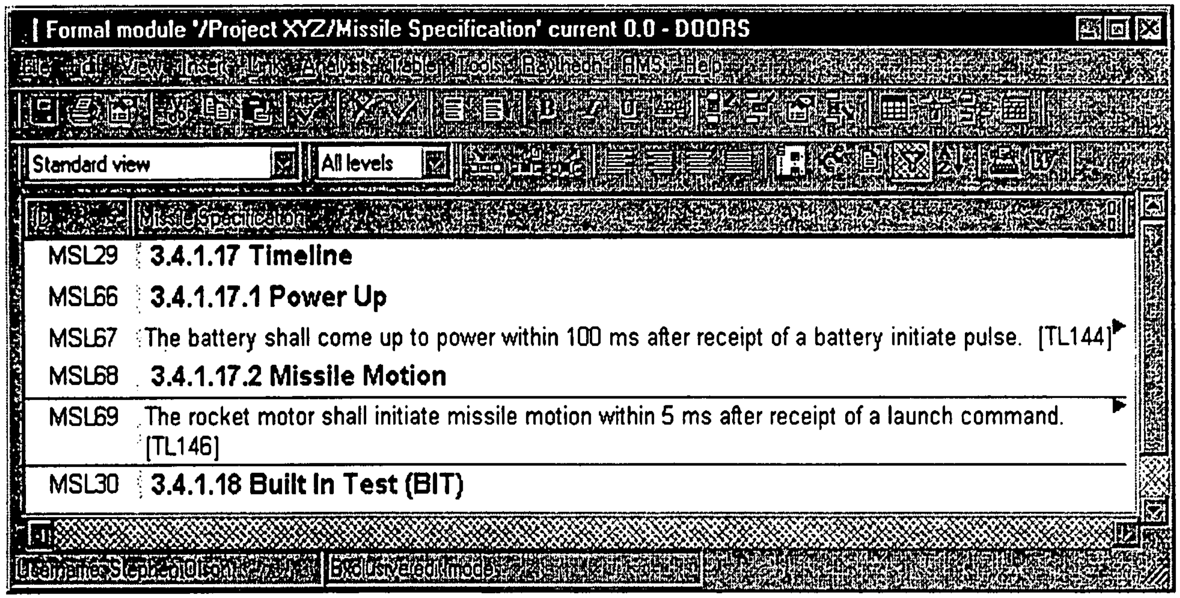
FIG. 8B


Formal module '/Project XYZ/Missile Specification' current 0.0 - DOORS
File Edit View Insert Link Analysis Table Tools Baytech RMS Help
Standard view
All levels
Exclusive edit mode

ID	Missile Specification
MSL29	**3.4.1.17 Timeline**
MSL66	**3.4.1.17.1 Power Up**
MSL67	The battery shall come up to power within 100 ms after receipt of a battery initiate pulse. [TL144]
MSL68	**3.4.1.17.2 Missile Motion**
MSL69	The rocket motor shall initiate missile motion within 5 ms after receipt of a launch command. [TL146]
MSL30	**3.4.1.18 Built In Test (BIT)**

FIG. 9

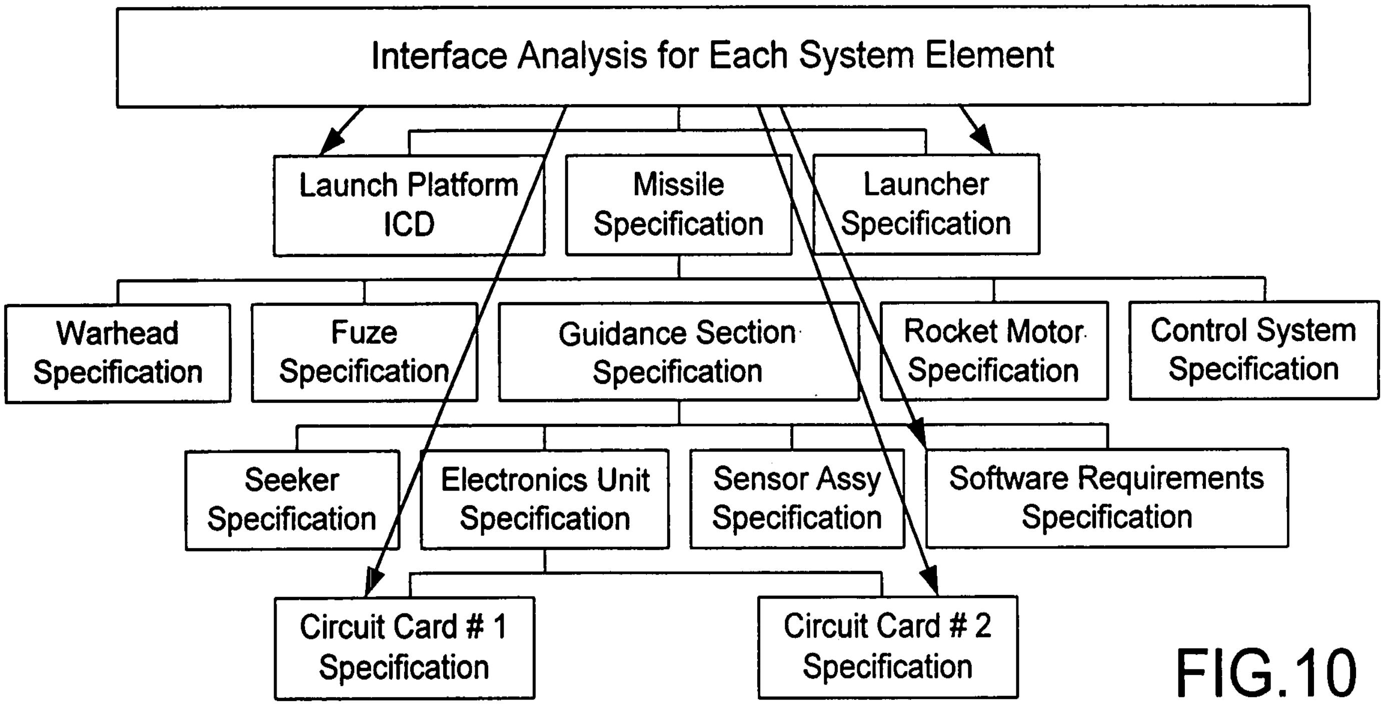

Interface Analysis for Each System Element
Launch Platform ICD
Missile Specification
Launcher Specification
Warhead Specification
Fuze Specification
Guidance Section Specification
Rocket Motor Specification
Control System Specification
Seeker Specification
Electronics Unit Specification
Sensor Assy Specification
Software Requirements Specification
Circuit Card # 1 Specification
Circuit Card # 2 Specification

FIG.10